

Claims

What is claimed is:

1. A radiation detackifiable, thermally stable adhesive composition comprising:  
5 a (meth)acrylate copolymer comprising from 85 wt. % to 97.5 wt. % of a (meth)acrylate ester and from 2.5 wt. % to 15 wt. % of a copolymerizable carboxylate monomer;  
a multi-functional urethane acrylate oligomer combined with said (meth)acrylate copolymer to provide from 25 parts to 40 parts of said oligomer per 100 parts of said copolymer; and

10 a thermally stable free radical initiator to conserve adhesive properties at temperatures from about 115°C to about 155°C, said adhesive composition becoming progressively detackified during exposure to ultraviolet radiation.

15 2. A radiation detackifiable, thermally stable adhesive according to claim 1, wherein  
20 said thermally stable free radical initiator comprises 1-benzoyl cyclohexanol.

3. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said (meth)acrylate ester is selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, isobutyl acrylate, 2-methylbutyl acrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, n-octyl acrylate, n-octyl methacrylate, isoctyl acrylate, isoctyl methacrylate, isononyl acrylate, isodecyl acrylate, isobornyl acrylate, vinyl acetate and mixtures thereof.

25 4. A radiation detackifiable, thermally stable adhesive composition according to claim 1, wherein said copolymerizable carboxylate monomer is selected from the group consisting of acrylic acid, methacrylic acid, beta-carboxyethyl acrylate, itaconic acid, crotonic acid, and fumaric acid.

10 5. A radiation detackifiable, thermally stable adhesive composition according to  
claim 1, wherein said multi-functional urethane acrylate is an aliphatic urethane acrylate  
oligomer.

15 6. A radiation detackifiable, thermally stable adhesive composition according to  
claim 1, wherein said multi-functional urethane acrylate is an aromatic urethane acrylate  
oligomer.

20 7. A radiation detackifiable, thermally stable adhesive composition according to  
claim 6, wherein said multi-functional urethane acrylate is a hexafunctional aromatic  
urethane acrylate oligomer.

25 8. A clear adhesive coated sheet for supporting a silicon wafer during manufacture of  
semiconductor micro-chips at elevated temperature, said coated sheet comprising:

30 a transparent film substrate;  
a radiation detackifiable, thermally stable adhesive composition comprising:  
a (meth)acrylate copolymer comprising from 85 wt. % to 97.5 wt. % of a  
(meth)acrylate ester and from 2.5 wt. % to 15 wt. % of a copolymerizable carboxylate  
monomer;

35 a multi-functional urethane acrylate oligomer combined with said (meth)acrylate  
copolymer to provide from 25 parts to 40 parts of said oligomer per 100 parts of said  
copolymer; and

40 a thermally stable free radical initiator to conserve adhesive properties at  
temperatures from about 115°C to about 155°C, said adhesive composition becoming  
45 progressively detackified during exposure to ultraviolet radiation.

50 9. A clear adhesive coated sheet according to claim 8, wherein said thermally stable  
free radical initiator comprises 1-benzoylcyclohexanol.

55 10. A clear adhesive coated sheet according to claim 8, wherein said adhesive sheet  
has an initial 180° peel adhesion from stainless steel from about 200g/25mm to about  
60 2,500/25mm, said 180° peel adhesion falling to between about 25g/25mm to about

300g/25mm after exposure of said coated sheet to about 400 mJ/cm<sup>2</sup> radiation from a medium pressure mercury arc lamp said coated sheet having a haze level of less than 8, before and after exposure to radiation, as measured using a BYK Gardner HAZEGARD XL-211 tester.

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11. A clear adhesive coated sheet according to claim 10, wherein said adhesive sheet has an initial 180° peel adhesion from stainless steel from about 200g/25mm to about 2,500/25mm, said 180° peel adhesion falling to between about 25g/25mm and about 200g/25mm after exposure of said coated sheet to about 400 mJ/cm<sup>2</sup> radiation from a medium pressure mercury arc lamp.

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12. A clear adhesive coated sheet according to claim 8, wherein said (meth)acrylate ester is selected from the group consisting of methyl acrylate, ethyl acrylate, propyl acrylate, n-butyl acrylate, isobutyl acrylate, 2-methylbutyl acrylate, 2-ethylhexyl acrylate, 2-ethylhexyl methacrylate, n-octyl acrylate, n-octyl methacrylate, isoctyl acrylate, isoctyl methacrylate, isononyl acrylate, isodecyl acrylate, isobornyl acrylate, vinyl acetate and mixtures thereof.

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13. A clear adhesive coated sheet according to claim 8, wherein said copolymerizable carboxylate monomer is selected from the group consisting of acrylic acid, methacrylic acid, beta-carboxyethyl acrylate, itaconic acid, crotonic acid, and fumaric acid.

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14. A clear adhesive coated sheet according to claim 8, wherein said multi-functional urethane acrylate is an aliphatic urethane acrylate oligomer.

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15. A clear adhesive coated sheet according to claim 8, wherein said multi-functional urethane acrylate is an aromatic urethane acrylate oligomer.

16. A clear adhesive coated sheet according to claim 15, wherein said multi-functional urethane acrylate is hexafunctional aromatic urethane acrylate oligomer.